

© Springer-Verlag Berlin Heidelberg 2010

Ana Iglesias, Lourdes Moreno, Paloma Martínez, Javier Jiménez, (2010). Supporting Teachers to Automatically Build Accessible Pedagogical Resources: The APEINTA Project, Athens, Greece, May, 2010, 1st International Conference on Technology Enhanced Education and Quality of Teaching (TECH-EDUCATION 2010). *Technology Enhanced Learning. Quality of Teaching and Educational Reform*, Springer. (Communications in Computer and Information Science, v. 73). ISBN: 978-3-642-13165-3, Pp. 620-624.

DOI: http://dx.doi.org/10.1007/978-3-642-13166-0_86

Supporting Teachers to Automatically Build Accessible Pedagogical Resources: The APEINTA Project

Ana Iglesias¹, Lourdes Moreno¹, and Javier Jiménez²

¹ Computer Science Department

Universidad Carlos III de Madrid

Avda. Universidad, 30 – 28911 Leganés (Madrid), Spain

{aiglesia, lmoreno}@inf.uc3m.es}

² Spanish Centre of Captioning and Audio Description (CESyA)

Avda. Gregorio P. Barba, 1 - 28918 Leganés (Madrid), Spain

{jjdorado}@cesya.es

Abstract. Most of the universities in Europe have started their process of adaptation towards a common educational space according to the European Higher Education Area (EHEA). The social dimension of the Bologna Process is a constituent part of the EHEA and it is a necessary condition for the attractiveness and competitiveness of the EHEA. Two of the main features of the social dimension are the equal access for all the students and the lifelong learning. One of the main problems of the adaptation process to the EHEA is that the teachers have no previous references and models to develop new pedagogical experiences accessible to all the students, nevertheless of their abilities, capabilities or accessibility characteristics. The APEINTA project presented in this paper can be used as a helpful tool for teachers in order to cope with the teaching demands of EHEA, helping the teachers to automatically build accessible pedagogical resources even when the teachers are not accessibility experts. This educational project has been successfully used in 2009 in two different degrees at the Carlos III University of Madrid: *Computer Science* and *Library and Information Science*.

Keywords: European Higher Education Area, EHEA, Teaching Support, Inclusive Technologies, Technology Enhanced Learning, People with special needs.

1 Introduction

Nowadays, the use of new technology is growing in every field of education. This technology can be useful not only for students but also for teachers. The proper use of the technology permits to support the students learning, adapting the pedagogical resources and strategies to each student individually, but also permits to support the teachers in the adaptation to the European High Educational Area (EHEA) learning model.

Currently, most of the European universities are adapting their pedagogical approaches towards a common educational space according to the European Higher Education Area (EHEA). More than 40 countries are involved in the EHEA in order to improve the quality and competitiveness of European universities, fostering student's mobility throughout Europe. The convergence towards the EHEA demands new

methodological learning process and structural changes that can be summarized in three main pillars when the subjects are been adapted: the new role of teachers and students (the use of student-oriented methodologies), the need to introduce ECTS credits and the importance of transversal competences.

This paper and the APEINTA project¹ are focused in the social dimension of the EHEA. Two of the main features of the social dimension are the equal access for all the students and the lifelong learning, which should be used in order to face the challenges of competitiveness, the use of new technologies and to improve the social cohesion, equal opportunities and quality of life.

The APEINTA project is a Spanish educational project where the Spanish Centre of Captioning and Audiodescription (CESyA) and the Computer Science Department and the Electronic Technology Department of the Universidad Carlos III de Madrid collaborate in order to provide inclusive education for all, independently of the students' abilities. This project has two main objectives: first to avoid barriers among the students and the education, proposing inclusive proposals in and out of the classroom; and second, to prevent one of the main problems of the adaptation process to the EHEA: the teachers have no previous references and models to develop new pedagogical experiences accessible to all the students. APEINTA can be used as a helpful tool for automatically build accessible learning courses and to adapt to the EHEA's requirements in its social dimension. Then, APEINTA is student-centered and teacher-centered.

APEINTA has been successfully used in 2009 in two different degrees at the Carlos III University of Madrid: *Computer Science* and *Library and Information Science* and this project received in 2009 the FIAPAS² award for research and innovation in education.

2 State of the Art

Different reports, documents and declarations have been generated about the Bologna Process, providing teachers information for facing the challenge of adapting their subjects to the new system. Moreover, different projects as the Turing Educational Structures in Europe project [1] present methodologies and studies for redesigning, developing, implementing and evaluating study programs for each of the Bologna cycles.

The EHEA process began in 1999 in Bologna and the main objectives fixed in the official declaration [2] were adapted and modified through subsequent governmental meetings in Prague (2001), Berlin (2003), Bergen (2005) and London (2007). The social dimension of the EHEA was included in Prague (2001) and adapted lately. Currently, two of the main features of the social dimension are: first, the necessity of making quality higher education equally accessible to all and second the necessity of responding strategically to the lifelong learning agenda. The institutions may enhance student-centred and flexible learning, tackling the social objective of ensuring equality of access to higher education for all [3].

¹ APEINTA was partially founded by the Spanish Minister of Education and Sciences (EA2008-0312).

² FIAPAS is the Spanish Confederation of Parents and Friends of Deaf People.

Today, the use of Learning Content Management Systems (LCMS) or Virtual Learning Environments (VLE) is been widely extended in the educational sector, above all in e-Learning systems [4]. LCMSs provide tools for authoring and reusing or re-purposing contents as well as virtual spaces for student interaction (such as discussion forums, live chat rooms and live web-conferences). Last years European universities have started to use this LCMS in order to support the teachers in their adaptation to EHEA, however, most of the LCMS used present accessibility problems [5] that teachers do not usually can notice because they are not experts in accessibility issues. For instance, the teachers should need to validate the HTML code automatically produced by the LCMS in order to check accessibility problems, but s/he could not be prepared for it.

Most of the LCMSs are web-based systems and they can present accessibility barriers that could affect different types of users. Therefore, in order to build an accessible system using a LCMS, it is necessary to follow Inclusive methodologies [6] and Principles of Universal Design [7] from the very beginning of the system design.

The APEINTA project presented in this paper not only provides an accessible LCMS in order to support the teachers in the building process of pedagogical courses, but it also is able to automatically build accessible resources thanks to services provided in the classroom by APEINTA.

3 The APEINTA Project

The APEINTA architecture shown in Figure 1 presents two well differentiated applications: a real-time captioning and synthetic speaking multisystem used in the classroom in order to avoid physical barriers for hearing impaired students and students with speaking problems [8]; and a Web platform with accessible digital contents that can be used in and out of the classroom for students of all abilities, including benefits in their learning [9].

Out the classroom, a Web platform provides access to pedagogical contents such as video, slides and other documents. The Web-platform is an accessible Virtual Learning Environment that has been developed using the dotLRN v.2.4.1³ LCMS, building accessible templates and modifying some configuration parameters in order to ensure a minimum of accessibility when an inexperienced person is building new pedagogical resources.

Moreover, the real-time transcription service used mainly in the classroom allows to automatically generate educational resources such as audio and synchronized subtitles or notes in different formats. All this resources automatically generated joint to the podcast videos of the classes can be lately published in the Web-platform as an accessible resource available for all the students.

For the teachers, the use of APEINTA is really useful because they could be able to generate accessible pedagogical resources in accessible Web-learning platforms without the necessity of be accessibility expert.

The APEINTA project has been successfully used in the Universidad Carlos III of Madrid University (SPAIN) in 2009. Teachers of *Computer Science* degree and *Library and Information Science* used APEINTA and all of them agree in the usefulness of the project for adapting to the EHEA. In figure 2 an accessible video of *Database*

³ dotLRN v2.4.1 (2009). Available at <http://dotlrn.org/download>

Design class of Computer Science degree is presented. This video is currently published in the private Web-page of the subject, so every student could download it. This video presents real time captioning generated automatically during the class thanks to the real-time transcription service of APEINTA.

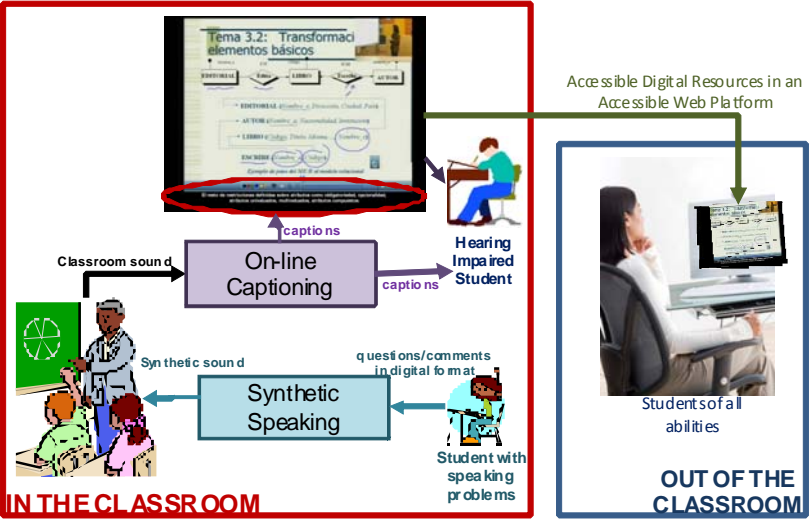


Fig. 1. APEINTA architecture

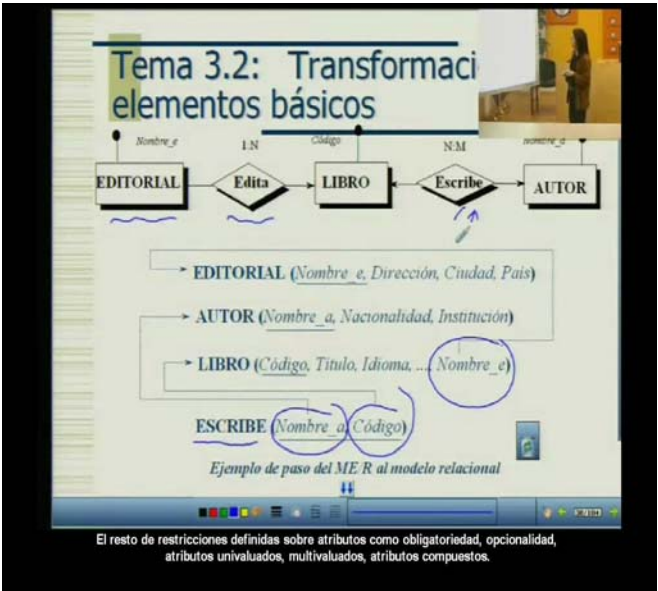


Fig. 2. Podcast video of a class with captioning automatically generated by APEINTA

4 Conclusions and Further Research

The APEINTA project is a student-centered and teacher-centered project that provides helpful services for the convergence to the EHEA. This project has two main objectives: first to avoid physical barriers among the students and the education, proposing inclusive proposals in and out of the classroom; and second to support the teachers in the process of building and editing accessible learning courses with accessible digital resources.

This paper is mainly focused in the teacher support for generating accessible learning courses and resources, underlying that teachers do not have to be accessibility experts in order to build accessible learning systems. This characteristic makes easier to the educational centers to adapt to the EHEA.

References

1. González, J., Wagenaar, R. (eds.): Universities' Contribution to the Bologna Process: An Introduction. Publicaciones de la Universidad de Deusto, Bilbao (2008)
2. Confederation of EU Rectors' Conferences and the Association of European Universities, CRE, The Bologna Declaration on the European space for higher education: an explanation (1999), <http://ec.europa.eu/education/policies/educ/bologna/bologna.pdf>
3. Croisier, D., Purser, L., Smidt, H.: Trends V: Universities shaping the European Higher Education Area. EUA report (2007), http://www.eua.be/fileadmin/user_upload/files/Publications/Final_Trends_Report_May_10.pdf
4. Pizzutilo, S., Tangorra, F., Carolis, B.: An e-Learning environment based on open-source software. In: Proceedings of the 4th WSEAS International Conference on Telecommunications and Informatics (2005)
5. Karampiperis, P., Samsong, D.: Designing learning systems to provide accessible services. In: W4A 2005, pp. 72–80 (2005)
6. Newell, A.F., Gregor, P.: User sensitive inclusive design— in search of a new paradigm. In: Proceedings on the 2000 Conference on Universal Usability, CUU 2000, pp. 39–44 (2000), <http://doi.acm.org/10.1145/355460.355470>
7. Connell, B.R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M., Vanderheiden, G.: Principles of Universal Design. North Carolina State University, The Center for Universal Design (1997), http://www.design.ncsu.edu/cud/univ_design/princ_overview.htm
8. Jiménez, J., Revuelta, P., Iglesias, A., Moreno, L.: Evaluating the use of ASR and TTS Technologies in the classroom: The APEINTA Project. In: Proceedings of ED-MEDIA (in press, 2010)
9. Moreno, L., Iglesias, A., Castro, E., Martínez, P.: Using accesible digital resources for teaching database design: Towards an inclusive distance learning proposal. In: Proceedings of the 13th annual conference on Innovation and Technology in Computer Science Education, pp. 32–36 (2008)